A PRELIMINARY STUDY OF PENNSYLVANIA MECOPTERA

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HISTORY

Early references were made to Mecoptera by Pliny and Aristotle. They spoke of them as winged scorpions which no doubt referred to these insects. The first definite reference to Mecoptera is that of Aldrovandi (1602) who placed them in the Diptera. In the tenth edition of Systema Naturae (1758) Linnaeus grouped them in the genus Panorpa and the order Neuroptera. Latrielle (1801) placed them in a separate family, the Panorpatae. The order Mecaptera was established by Packard (1886) and this was changed by Comstock (1895) to Mecoptera as it stands today.

The Mecoptera form a small group and comparatively few papers have been published on this order. The best and most comprehensive is that by Carpenter (1931) on the revision of the Nearctic species. Setty (1940) contributed considerable on the family Bittacidae. Carpenter and Tillyard have published several articles on the fossil species. Many notes on individual species have been published, but no extensive papers have appeared since 1931.

IMPORTANCE OF GROUP

They are interesting insects and at times and in certain localities are frequently abundant. However, they have been collected and studied by comparatively few entomologists. This is partly due to the fact that they are of little economic importance except as food for other animals or in their capacity as scavengers. Although not of direct importance to man, it is significant that they do not destroy foliage or vegetation and do not bite or inconvenience him in any way.

The Mecoptera are valuable in fundamental taxonomic studies. Their primitive structure and ancient origin has aided in study-

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ing the development of morphological structures in closely related orders. As a matter of fact, these studies have served to bring this, one of the smallest of insect orders, into prominence. Based on numerous fossil remains obtained from the Carboniferous, Permian, Triassic and Jurassic periods, Tillyard (1935) has shown that the Trichoptera, Lepidoptera, Diptera and probably the Siphonaptera have all originated with the Mecoptera from a common ancestor. It is also interesting to note that the Mecoptera were more abundant during the Permian period than at the present. Carpenter (1930) gives figures to show that they constituted 9.0 per cent of the total insects in the Permian, 3.3 per cent in the Tertiary and only .035 per cent at the present.

CLASSIFICATION

Approximately 300 species of Mecoptera are known from the world. Three-fourths of them are found in temperate and subtropical regions. Their distribution includes Australia, New Zealand, Europe, Central, South and North America. About 70 species have been described from North America and twenty-three are definitely known from Pennsylvania.

Six families of Mecoptera are recognized: The Notiothaumidae, Nannochoristidae, Meropidae, Bittacidae, Panorpidae, and Boreidae. Only the last four of these occur in Pennsylvania. The largest number of species belong to the family Panorpidae which is found over the entire Holarctic region and in parts of the tropics. The Bittacidae is the next largest family and is found in both the temperate and tropical regions of both hemispheres. The Boreidae are represented by 12 species in Europe and North America. Only a single species of the Family Meropidae is known and this occurs in Eastern United States.

COMMON NAMES

The Mecoptera are popularly known as scorpion flies, however, only the males of the Panorpidae have a scorpion-like appearance. Some workers therefore prefer to call them snout flies. The Boreidae are frequently called snow scorpion flies or snow fleas because they are commonly found on the snow. The Bittacidae, which resemble craneflies in their manner of hanging by their front legs, are often called hanging snout flies.

HABITATS

Mecoptera are generally found in damp, shady and well forested areas especially near streams. They are frequently associated with blackberry, nettle, jewelweed, goldenrod, ferns, grasses, mosses and broad leaved plants. On the other hand they are sometimes collected in open sunny places. The Bittacidae hang from the undersides of the foliage and when disturbed fly close to the ground for some distance and eventually hide in dead leaves or dense foliage. They resemble certain craneflies in their flight and are often mistaken for them. They are essentially predacious and feed primarily upon Diptera, consuming the body fluids and softer parts. The Panorpidae usually rest on the upper surface of the leaves and after being disturbed either drop to the ground or fly a short distance returning to the same general area. They are principally saprophagous, feeding upon disabled or freshly killed insects. Caterpillars and adult flies make up the larger part of their diet but they occasionally feed on nectar, pollen and parts of flowers or fruit. The Boreidae are found in moss at the bases of trees and are most readily located when there is snow on the ground. They frequent the higher elevations in wooded areas. These snout flies are phytophagous but may feed on Podura, Collembola and other tiny animals in the moss where they occur.

The larvae of all species are difficult to locate. They inhabit mosses, dead leaves and soil cover in wooded places.

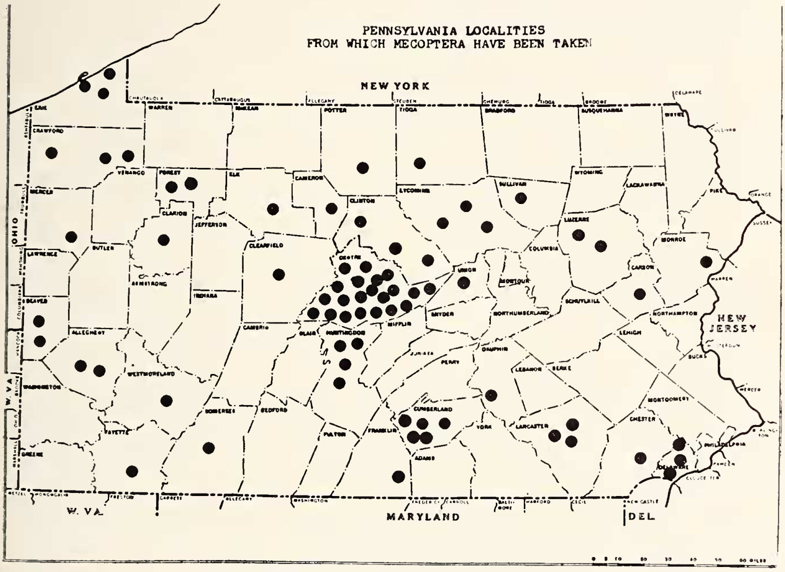
Over 12,000 specimens of Mecoptera have been collected from 73 localities and 30 counties in Pennsylvania representing a relatively large part of the state as indicated on the accompanying map. These studies have been based on several hundred specimens in the collection of the Pennsylvania State University; numerous specimens in the collection of the Pennsylvania Academy of Natural Sciences, Philadelphia; those in the collection of the Bureau of Plant Industry, Harrisburg; and a rather sizeable collection in the Carnegie Museum, Pittsburgh. Records published by Carpenter (1931) and Hine (1901) have also been included. Twenty-three species have been taken in Pennsylvania as indicated by Table 1. Most of these were collected individually. At times some species such as *Panorpa maculosa* Hagen or *Bittacus apicalis* Hagen were obtained accidentally in sweep-ing low vegetation. On one occasion 10 to 12 specimens of the latter species were taken with practically every sweep of the net. Some species were collected in light or bait traps. The numbers from these latter sources were small. *Merope tuber* Newm. was taken twice from the surface of water in a bucket. Once, this somewhat rare species flew into an open window at night.

MECOPTERA TAKEN IN PENNSYLVANIA

Species	Number of localities	Range of collections	Abundance
Panorpa acuta Carp.	21	6/ 4–8/28	V. common
Panorpa bifida Carp.	2	7/18–31	Rare
Panorpa canadensis Banks	33	5/18–9/11	V. common
Panorpa claripennis Hine	1	5/29	V. rare
Panorpa decorata Carp.	1	7/4	V. rare
Panorpa elaborata Carp.	3	6/ 9–7/15	V. rare
Panorpa latipennis Hine	4	5/11–7/15	Rare
Panorpa maculosa Hagen	28	5/23–8/30	V. common
Panorpa mirabilis Carp.	1	6/6	Rare
Panorpa nebulosa Westw.	18	5/30–9/ 2	V. common
Panorpa rufescens Ramb.	4	6/ 6–8/18	V. rare
Panorpa signifer Banks	10	6/27–9/17	Rare
Panorpa subfurcata Westw.	6	6/ 9–6/30	Rare
Panorpa submaculosa Carp.	17	5/26–8/15	Common
Panorpa venosa Westw.	12	5/30–8/10	Rare
Bittacus apicalis Hagen	5	6/18–7/21	Common
Bittacus occidentalis Walker	1	9/ 4–9/19	V. rare
Bittacus pilicornis Westw.	19	6/ 4–8/15	Common
Bittacus stigmaterus Say	3	7/14	V. rare
Bittacus strigosus Hagen	9	7/ 1–8/13	Common
Boreus brumalis Fitch	2	1/ 5–2/23	Common
Boreus nivoriundus Fitch	3	1/ 5–2/23	Rare
Merope tuber Newm.	4	6/19–9/ 7	Rare

Most of the species are generally distributed throughout the state; however some seem to be limited. *Bittacus apicalis* has been taken only in the central and western part of the state. It is recorded from Lycoming, Fayette and Beaver counties and at times is very abundant. As the species is readily identified, it is doubtful if it could have been overlooked in other areas. *Merope tuber* seems to be limited to the central and western part of the state. It has been taken only in Clearfield, Allegheny and Fayette counties. This species, unlike the former, is rare and as previously stated all specimens were accidental catches.

Only individual specimens of *Panorpa claripennis* and *Bittacus occidentalis* have been taken in Pennsylvania. It is interesting to note that a single Pennsylvania specimen of *Bittacus occidentalis,* which was taken in Erie county now rests in the British Museum.



In addition to the species listed in Table 1, several which have been taken in New York and New Jersey might be expected to occur in Pennsylvania. These include *Panorpa americana* Swed., *P. banksi* Hine, *P. chelata* Carp., *P. dissimilis* Carp., and *P. virginia* Banks.

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many highly specialized (and expensive) pieces of apparatus usually used by professional photographers.

The meeting adjourned at 9:30 P.M.

Louis S. Marks, *Secretary*

Meeting of January 20, 1953

A regular meeting of the Society was held at the American Museum of Natural History; Dr. Clausen presiding. There were 17 members and six guests present. The minutes of the previous meeting were read and approved.

The Treasurer's report was received.

The President announced, with sorrow, the death of Mrs. John D. Sherman, Jr. The Secretary was empowered to send to the Sherman family a proper letter of condolence.

The feature of the evening was a ''Symposium on Lepidoptera'' led by Dr. Frederick Rindge, lepidopterist of the Department of Insects and Spiders of the American Museum of Natural History.

Dr. Rindge said that the Lepidoptera are divided into about 190 families and that those of North America and Europe are relatively well known. In North America, north of Mexico there are about 10,000 species representing 70 families. Dr. Rindge pointed out that, in contrast to the western states, the eastern part of the country has been very poorly collected. He based his statements on the series of specimens in the American Museum collections. He then outlined the salient features of the order.

Dr. George Rawson contributed some notes on his recent trip to the arctic, specifically in the vicinity of Point Barrow, Alaska. He pointed out that in the arctic the Diptera replace the Lepidoptera as flower pollinators.

A lively discussion followed on the proclivity of bats in eating Lepidoptera with participation by Treat, Rindge, Hessel, Rawson and Ziegler. Other contributors to the discussion were Mullen, Marks, Hopf and Clausen.

The meeting adjourned at 9:30 P.M.

Louis S. Marks, *Secretary*

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